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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,571	03/17/2004	Aelan Mosden	247563US6YA	2738
22850 7590 04/20/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER DUDA, KATHLEEN	
			ART UNIT 1756	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE			NOTIFICATION DATE	DELIVERY MODE
3 MONTHS			04/20/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/20/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

Application No.

10/801,571

Applicant(s)

MOSDEN ET AL.

Examiner

Kathleen Duda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12/7/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9 and 21-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-7 is/are rejected.
- 7) ☒ Claim(s) 2, 8, 9 and 21-32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892).
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. Claims 1, 2, 4-9 and 21-32 are pending in this application.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angelopoulos (US 6,316,167) in view of Masuyama (US 5,114,529).

A RCHX film is deposited over an oxide layer (thin film). R is selected from the group consisting of Si, Ge, B, Sn, Fe, Ti and combination thereof and X is not present or selected from the group of one or more of O, N, S and F. The RCHX layers are useful as hardmask, antireflection layers. The photoresist patterns are transferred into the RCHX film, after which the photoresist is ashed. The RCHX feature is transferred into the oxide layer. See abstract, col.14, 11-17. Angelopoulos is silent on conditions used to ash the photoresist layer. Masuyama teaches that photoresist ashing is typically performed by utilizing an oxygen plasma (col.1, 16-17). It would have been

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obvious to one of ordinary skill in the art that the ashing of the photoresist in the method of Angelopoulous was performed using an oxygen plasma because Masuyama teaches that photoresist ashing is typically performed by utilizing an oxygen plasma. While references do not explicitly disclose that the surface of the RCHX is treated in the oxygen plasma, one of ordinary skill in the art would have to expect the RCHX surface was exposed to the oxygen plasma and therefore modified as patterned portions the RCHX surface were exposed to an oxygen plasma during the photoresist ashing. The reference does not disclose altering the surface layer to a depth of at least 10 angstroms. However it is known by those of ordinary skill in the art that the amount of conversion of the surface would be dependent on the conditions in which the layer was exposed to the oxygen plasma, including exposure time, temperature and oxygen concentration, thereby establishing the altered surface depth as a result effective variable. It would within the ordinary skill of one in the art to determine the optimal altered surface depth by routine experimentation and have a depth of at least 10 angstroms, if required, because the depth is a result-effective variable dependent on the conditions of oxygen plasma exposure and the discovery of an optimum value of a result effective variable is ordinary within the skill of the art, as taught by *In re Boesch*, (617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Applicant argues that the treatment of the ARC with the plasma is incidental. It does not matter if the treatment is incidental or purposeful, the treatment occurs.

Applicant argues that the photoresist is removed after all the etching occurs unlike the claimed process. Claim 1 requires removing the light-sensitive layer but does not specify when this step occurs. The treatment is said to occur after "at least a portion of the light-sensitive material is removed" but this language would include a developing step. It is suggested that the recitation of "removing said layer of light-sensitive material" be amended to include when the step occurs, i.e., after the etching of the patterned hard mask but before treatment of the hard mask and the thin film etching step.

### ***Response to Amendment***

4. The art rejections using the Sachdev and Stojakovic references have been removed for the following reasons: In the Sachdev reference, layer 6 was considered to be the thin film by the examiner. The claims have now been amended to specifically recite the materials of this layer. Sachdev does not meet this limitation. Stojakovic teaches using a photoresist and ARC to create the hard mask and that they are removed prior to etching

layers 64 and 66. The ARC is not used as an etching mask as now recited in the amended claims.

***Allowable Subject Matter***

5. Claims 2, 8, 9 and 21-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication should be directed to Examiner K. Duda at (571) 272-1383. Official FAX communications should be sent to (571) 273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff, can be reached at 571-272-1385.

Information regarding the status of an application may be obtained from the Patent Application Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Kathleen Duda  
Primary Examiner  
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